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Summer Research and Creativity Grants

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Summer Research and Creativity Grants

Each year, Undergraduate Education supports a number of students who are conducting research or other creative and scholarly projects during the summer months. These grants are administered through eUreKa! For details and deadlines, please visit www.uky.edu/eureka. The following abstracts were prepared by students who received summer research and creativity awards in 2005.

Theatrical Discourse in Early Modern England Abstract By Andrew Bozio

English

Since Ben Jonson famously wrote that Shakespeare "was not of an age, but for all time," the Bard of Stratford-upon-Avon has been treated as a master of Western literature, a poet whose pen captures the Timeless Truths of humanity. My research, following the recent trend in Renaissance scholarship, takes issue with Jonson's sentiment and attempts to demonstrate that Shakespeare and his plays were in fact constructed by the discourses of his age. That the Shakespearean oeuvre references, and at times actively engages, fundamental issues at the heart of early modern England — patriarchy, colonialism, the performance of power, and the very nature of representation itself — is the guiding principle of my work.

To examine Shakespeare and his contemporaries from this position, I am performing an archaeology of Renaissance ideology to understand how these works may have contributed to the dissemination of discourse. In an attempt to recreate the conceptual framework surrounding the playhouses, my research has involved a careful study of the pamphlets written about early modern drama in England, specifically the fierce anti-theatrical polemics that accused the theaters of being houses of sin. By reading these treatises and teasing out the latent assumptions that guide their arguments, I hope to conceptualize how the first audiences of Shakespeare's plays would have approached the performance. Would they have seen in *Twelfth Night* merely a bawdy farce? Or the sinful act of a boy cross-dressing to play a girl who plays a boy? Or would they have intuited a veiled attack on patriarchal discourse?

Drawing on Foucault, Derrida, Bourdieu, and other philosophers, I am also attempting to confront the theoretical problems inherent in any research that claims to uncover and reconstruct what occurred in the past. This aspect of my research, in which method becomes a secondary theme, further distances the project



from the New Critical approach and instead grounds the work in the self-aware, even self-referential style of post-structuralist writing. This is the next stage — as I convert my notes from summer research into a finalized project, eventually into a Gaines thesis, to lend validity to the project by considering the assumptions that have governed my scholarship.

Inferring Protonation Status and H-Bonding Status from Crystallographic Distances in the Active Site of Q69E-FeSOD

Abstract By Yuriy Bronshteyn

Chemistry

Free-radical superoxide inflicts oxidative damage on nearly all cells exposed to oxygen and has been implicated in the mechanisms of aging. A class of enzymes called superoxide dismutases (SODs) detoxifies superoxide into hydrogen peroxide and oxygen through disproportionation.



This project examined the role of H-bonding in the activation of a mutant form of one such Fe-containing SOD (FeSOD): Q69E-FeSOD. The mutation of Gln to Glu was known to preserve the heavy atom structure of wild type FeSOD while disrupting its H-bonding network. By comparing protein crystal structures of the mutant with high resolution, small molecule distances from published studies documented in the Cambridge Crystallographic Data Centre (CCDC), we sought to identify the protonation states of Glu69 and its coordinated solvent. Though CCDC data alone could not effectively rule out -OH, we determined that the coordinated solvent was H₂O based on the dual experimental findings that Q69E-FeSOD remains completely reduced and Fe²⁺ is found to be much more commonly associated with H₂O than -OH. Comparisons of experimental and CCDC C-to-O bond lengths also indicated Glu69 is best described not as a carboxylate but as a carboxylic acid, in spite of its experimental behavior as an H-bond acceptor with respect to the coordinated solvent. We propose that Glu69 donates an H-bond to Tyr34 in order to accept an H-bond from H₂O. A prerequisite for this model is the depression of Tyr34's pKa. We will titrate Tyr34 to test this assumption and hence our model.

The Left Hand Side

Abstract By Nathan Dickerson

English

The novel was my chosen medium for articulating the political forces at work in the 2004 Presidential Election. With sex, religion, and war swirling within the political discourse, the fiasco was a confounding experience. I hoped that by writing a novel dealing with conflicting ideas and the forces that create them, the dynamic of the battle in the political sphere would become more accessible to me and, perhaps, to others who read my reality-based fiction. After spending the summer continuing work on *The Left Hand Side*, I have developed a significantly more sophisticated understanding of U.S. culture and politics.

The dominant political persuasion in American culture is currently conservatism. In order to deal with conservative ideas most accurately in my writing, I wanted to thoroughly understand the rise of this paradigm in America. My research led me to a notable conservative thinker, Irving Kristol and his book, *Neoconservatism: An Autobiography of an Idea*. His extensive collection of essays and articles unraveled much of the cryptic political philosophy behind neoconservatism, and it was Kristol's paradoxical endorsement of public religion but subtle, private dismissal of religion's credibility that best epitomized a disingenuous theme within the ideas promoted by neoconservatives.

Additionally, David Brock's *The Republican Noise Machine: Right-Wing Media and How It Corrupts Democracy* provided much insight into the infrastructure that backs conservative ideas, such as the substantial funding by Joseph Coors of the Coors Brewing Company that created the conservative think tank The Heritage Foundation. Thomas Frank's *What's the Matter with Kansas?* was also very helpful in detailing how historically liberal demographics became conservative over social issues. These readings, as well as several others, helped me understand exactly what forces are at work in the growing conservative movement.

With a foundational understanding of the basic political dynamics, I have currently focused on enhancing my comprehension of the consequences of these conservative ideological trends. Neoconservatism's disingenuous endorsement of certain religions does promote morality within the general population, but it also disrupts the integration of sexual, religious, and non-religious minorities into the community. The more credulous conservative adherents, while often very well intentioned, can be predisposed to binaries of good and evil that also can lead to superfluous exclusivity. In writing *The Left Hand Side*, I hope to thoughtfully highlight and explore these xenophobic tendencies of conservatism. Furthermore, I am addressing the phenomenon of intrapersonal and interpersonal conflict, why it happens, and its consequences. I am currently undecided on whether to publish *The Left Hand Side* when I complete it. The decision will hinge on my own satisfaction with my success at articulating the aforementioned ideas and the feedback I get from others.

Fiction from Truth: an Exploration of John Steinbeck's Relationship to Place

Abstract By Mallory Emerson

English

While there is evidence of the importance of place in many levels of John Steinbeck's writing, the literature itself does not always reveal the complexity of the author's tie to place in general and, specifically to his boyhood home in Salinas, California. From the titles of essays and novels such as "Always Something to Do in Salinas," *Cannery Row*, *The Long Valley*, and *The Sea of Cortez*, the central role of setting as more than a location for the action of the work is in the forefront. Similarly, the biblical allusions in the titles of *East of Eden* and *Pastures of Heaven* present a more symbolic shaping of the appearance and influence of place.

In some works, however, such as *To A God Unknown* and *The Grapes of Wrath*, the titles refer to other literary aspects, but throughout the works the importance of the land and the setting are emphasized in the contacts between characters and place. Although much of his writing seems to present a nostalgic view of the Salinas valley, from early on, John Steinbeck was unhappy with the town of Salinas and its social, political, and educational constructions. The novels reveal various effects of Salinas on Steinbeck; and the surrounding areas, current institutions, events, and attitudes in these places suggest reciprocal influences on the place.

In downtown Salinas, sites such as The Steinbeck House, The Steinbeck Center, The Steinbeck Library, and Sang's Café, which boasts "John Steinbeck Ate At Sang's," suggest that at least a portion of the community finds a connection between the town and the life and work of the Nobel Prize-winning author. The effect is also felt in other areas such as Monterey's Cannery Row and San Jose State University's Center for Steinbeck Studies. The annual Steinbeck Festival is another example of the continued development of Salinas in conjunction with its relation to the literary work of John Steinbeck. With my Summer Research and Creativity Grant, I was able to attend this festival and explore many of these places both for research and experience. Although the Steinbeck Festival exposed me to various scholarly approaches to Steinbeck's relation to place — from Susan Shillinglaw's discussion of her upcoming work *Steinbeck's California*, and an interview with biographer Jackson Benson, focusing on Steinbeck's characterization as a western writer, to Dr. Joe Flora's presentation of the author's interaction with the

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American south — it provided a powerful view of how the literary, cultural, and social landscapes surrounding Steinbeck's writing are ever changing in ways related to the works.

The shifting dynamics of the Steinbeckian culture are evident in the transition from the first years of the festival, which celebrated its 25th year in the summer of 2005. For the first years, participants gathered at the festival to hear stories from individuals who had known Steinbeck. However, as the primary generation declined, the speakers began to take on the shape of a variety of scholars in many fields and spanned great expanses of topics within the realm of Steinbeck.

Like the history of the festival's relation to Steinbeck, the history of Salinas's relationship with the author has made dramatic changes — changes that illustrate the transformation that can occur in a place as a result of a literature that springs from its inhabitants. As with his negative perception of Salinas, many of Steinbeck's works met with disapproval and disdain from the general Salinas population. Despite this history, the Steinbeck Festival and other activities in the area seem to present a pride in the author's roots in the valley. The story though, is not one of constant support or amity from either side, and it is the complexity of the possibilities found within such a relationship that I will attempt to explore further, through a close examination of Steinbeck's work, in connection with scholarly views of the literature and the history of the Salinas Valley.

Crystallization Studies of Quenched PTT Films and Blending Characteristics of PTT/PEI Blends

Abstract By Terry W. Humphries

Department of Chemical and Materials Engineering

In this work, the crystallization characteristics of poly(trimethylene terephthalate) (PTT) were studied. In an attempt to obtain a wholly amorphous sample film, multiple techniques were used in sample preparation to create a film of amorphous nature. As a result, PTT films of approximately 15% crystallinity were obtained. In addition, blends of PTT with amorphous polyetherimide were prepared and explored as a method to control crystallinity in PTT. Blends were prepared via melt blending and solution blending in dichloroacetic acid in an attempt to obtain a fully

blended sample. In both blend preparation methods, as the composition of PTT increased, phase separation became more apparent.

In Baudelaire's Footsteps: A Look at 21st Century Paris Through Poetry

Abstract By Tasha Pedigo

English

In writing about my research, I feel it is best for me to mention the writers who inspired me, because in learning about them you will have a better understanding of my own research goals. First, I will say a little about the French poet Charles Baudelaire. Baudelaire was made famous by the poetry he left behind — *Les Fleurs Du Mal* (The Flowers of Evil) and also *The Spleen of Paris*. *The Spleen of Paris* was a landmark publication in poetry, because it recorded all angles of Paris — not the elegant and fashionable, but the night life, the poverty, the lives of people existing in a city full of beauty, but also ugliness.

As a poet and lover of painting an accurate portrait with words, I hope to follow in Baudelaire's footsteps and create a new body of work — a book of poetry recording Paris in the summer of 2005 in the same medium that Baudelaire chose in the early 20th century. I plan on writing one poem for every day that I am abroad. I settled on this number after reading the work of the contemporary American poet, David Lehman. Lehman, the founder of *The Best American Poetry* series wrote a book of poetry, *The Daily Mirror*, by which I have been fascinated for a long time. In the book, Lehman created one poem every day for a year. Therefore, I hope to blend the ideas of modern French poet Charles Baudelaire and contemporary poet David Lehman in creating a poem for every day that I am in France.

How are things coming so far? Things couldn't be better. I have been able to do a lot of traveling and have even written about my travels to Giverny — Monet's home —, Nice, in southern France, and I will soon be going to London. As you can see, the initial idea for my project has expanded into writing not just a poem a day about Paris, but my collection of poems now includes other places as well. Being abroad has certainly been a learning experience. I have been able to go to all the famous cafes made popular by Ernest Hemingway and other writers of the Lost Generation, stand a foot away from the work of Van Gogh, buy fresh fruit at the local market, and look out on all of Paris from the top of Sacre Coeur. I am always surprised by the beauty of every street corner and boulevard — a poet's dream. But I will be very glad when the work is done; I'm looking forward to reading over my poems after time has already passed and remembering Paris just as it was when I saw it — in my mind each poem serves as a sort of photo. I have also been keeping a journal while I've been abroad and feel that I've grown more disciplined as a writer. I can't imagine not taking that hour each morning to reflect on the previous day, journaling, and finding my poem. In some ways it is like discovering a diamond because, everyday, I know the poem will appear to me — and it always does. I hope I can stay this disciplined to my poetry when I return to UK! I can't wait to tell everyone about my travels. Of all things, I am sure that traveling is the greatest teacher.

Paris, summer, 2005

Tokyo: Decoding the Space of Disorder

Abstract By Katheryne Sharp

Architecture

How does one even begin to understand a city of 12 million people that has no street names?

To the Westerner accustomed to neat orthogonal blocks and grand gestures of urban planning (not to mention named streets), Tokyo is a city of chaos. Undermining this idea is the fact that it functions extremely well as the cultural, financial, and political heart of one of the most advanced countries in the world. Through searching for the underlying organization that makes such efficiency possible, one realizes that it is merely a conceit of the West to believe that we have the world of order cornered because we design our cities to have a certain outward appearance.

Uncovering Tokyo's hidden order requires more than a cursory glance at a map. The city functions like the intricately networked systems of a living organism, its spatial reality a consequence of much more than a simplistic scholarly ideal of what a city should look like. Many seemingly divergent factors — the wax food models in restaurant windows, the intricate nature of the kanji written character language system, the hierarchal nature of society, even the proliferation of manga, comic-style graphics in popular entertainment and advertising — inform us how a city with very little planning and a slash-and-burn attitude toward space can be imbued with a richness of cultural significance in every square inch of chaos.

To this effect, the thesis of my research is that the peculiar spatial structure of Tokyo is a consequence of the role of the visual in Japanese culture, along with the function of context and hierarchy in its society. Thus far, I have traveled to Tokyo and documented myself the experience of the city, alongside researching through scholarly sources the spatial, social, and political geography of Japan and the role of spatial upheaval in Tokyo's history. At this point I am integrating into a larger paper what I have learned experientially and, with the ideas garnered from previous research, preparing my findings for a lecture to be delivered this fall to the College of Design. I am also completing a presentation of creative studies — photographs, collages, and video art — that I have produced in response to my experience. I hope to accomplish these things not only to satisfy my fascination with the subject matter, but also to open others' eyes to the rich cultural ideas that can be expressed by a disordered city.

The Irish Software Industry

Abstract By Daniel Turner

Geography

Ireland is a country with a rich past and a deep heritage. For many generations, Ireland has been associated with hard luck and heavy drinking. Today, things are starting to change as Ireland emerges as a European leader. Within the past 30 years, Ireland has become an economic leader and earned itself the nickname "Celtic Tiger." This name comes

from the similarity in growth that Ireland has with the Asian Tigers. However, as the boom seems to be coming to an end, many people are asking questions about the growth: Where did it come from? Was it real? What are the long-term implications for Ireland?

I have chosen to look at one particular sector of Ireland's economy and to study how Ireland and its community leaders have tried to develop a thriving software industry. I feel this particular sector is one in which Ireland can be extremely competitive and continue its growth after foreign investment dries up. Therefore, I will investigate what has been done to promote this industry and how, in turn, software firms have reacted.

This summer I traveled to Ireland and interviewed government officials, community leaders, and software business owners. This field research gave me a first hand look at what is happening in Ireland, specifically in regard to their software industry. As I continue to review the interviews and look over the materials gathered, I am finding more avenues to investigate and more issues to tackle. The software industry is extremely dynamic, and the issues facing these firms are unique.

Through this research I hope to gain an understanding of the factors affecting the software industry's growth and development. I will then judge how effective government programs have been in helping to develop this industry. My findings will be presented in detail in my Gaines Thesis, and smaller, abbreviated versions may be submitted to scholarly journals.

WIND: A JOURNAL OF WRITING & COMMUNITY

Abstract By Erik Tuttle and Nick Smith

Appalachian Studies & Art

For our grant projects, we edited and published an issue of *WIND: A JOURNAL OF WRITING & COMMUNITY*. Nick's emphasis was on the aesthetic design of the issue and Erik's was on the conceptual and content-based layout of the journal. For three years, both of us have interned/apprenticed as editors at *WIND*. For this 94th issue of Kentucky's longest running independent literary journal, we exercised full responsibilities as Editor-in-Chief and Design Editor. We read and culled submissions, conceptually designed the sections of the journal, corresponded with authors, and completed all other responsibilities associated with the publication of a literary journal. This issue was a special issue-length Community Spotlight, focusing on the Hindman Writers Workshop. Within the covers of the issue are poems, stories, essays, and reviews by

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artists who are members of the Hindman Writers Workshop. There are also two CDs of oral histories from Hindman writers, which have glimpses of the history and experience of the workshop.

In the formation of the issue, Erik's research focused on the content and section structure of high quality national literary journals, including *McSweeney's*, *Poetry*, *Black Warrior Review*, *The Paris Review*, and *The Hudson Review*. As well, his research looked closely at the two previous Hindman publications *A Gathering at the Forks* and *Crossing Troublesome*. Seminal works in Appalachian literature were also focused on, including *MUCKED*, *New Ground*, *Pine Mountain Sand & Gravel*, and *Appalachian Heritage*. In terms of the specific aim of this issue, we tried to shine light onto the transcendent quality of Hindman, how the community spans generations of artists from decades ago to the present, to enrich emerging writers.

Beginning last fall, Nick started his study of typography and woodcuts. He has studied, chiefly, Robert Bringhurst and Albrecht Dürer, but also spent time learning from local artists such as Annabelle Wilson, Rebecca Howell, Alex Brooks, and Paul Holbrook. Throughout this process, he also studied well-made journals, the best being *McSweeney's*, a journal known for its design and content. The main part of the actual aesthetic design labor came late in the process of the journal. For the three days preceding the send-off to the printers, no less than seventy hours were spent bound to the computer, checking, re-checking, and fixing errors and oversights. Things to be decided were typefaces to be used, spread size, page length, size of the typeface, margins, illustrations, order of the pieces, title and masthead design, page numbering, and so on into sundry tedium. Concretely, we sought to visually represent the emotions portrayed in the pieces through the design.

Just weeks ago the first shipment of the completed issues came, barely in time for the 2005 Hindman workshop — one full year after the collection of the work. The issues were finished and presented at Hindman, where they were very warmly received by contributors and readers. After the second shipment comes in, issues will be mailed to our subscribers. Yet to be done are two readings to celebrate and announce the issue and the work contained within it. The first reading is tentatively planned to be at the Appalachian Studies Association Conference in March. As well, there will be a larger reading in Lexington at a date that has yet to be determined. This process has been long, difficult, and at times rather frustrating, but throughout it has been rewarding and overwhelmingly worthwhile.

Detecting Genetic Evidence of Sexual Reproduction in Sexual and Asexual Populations

Abstract By Charlotte Walter

Biology

The goal of this study is to test the prediction that genetic variation will be higher in sexually reproducing populations relative to asexually reproducing populations. Many species have both sexual and asexual modes of reproduction. The advantage of sexual reproduction is that it allows for the distributional increase/production of advantageous traits and the removal of deleterious mutations. Sexual reproduction allows for recombination resulting in genetically variable offspring. In contrast, asexual reproduction results in offspring of the same genotype as the parent. Thus, populations or species with sexual reproduction are expected to be more genetically diverse than populations or species without sexual reproduction. Very few studies have attempted to quantify the genetic variation in plant species that exhibit both sexual and asexual populations.

Marchantia inflexa is a thalloid dioecious liverwort distributed from the southeastern USA to northern Venezuela. *Marchantia inflexa* is an excellent system on which to test this prediction, because populations are known to contain both sexes or only one sex. The former can reproduce both sexually and asexually, while the latter must reproduce by asexual modes only. In addition to this sex distribution pattern, DNA sex-specific markers have been developed to sex non-sex expressing plants, and microsatellite loci (simple sequence repeats) were found to detect genetic variation among plants. Samples (tips of thalli) from six distinct populations were collected.

Three of these populations have female plants only (unisexual populations). Non-expressing samples of three other populations that are known to contain female and male plants (bisexual populations) were also collected. The sex of these samples was unknown. The 120 plants from the bisexual populations were sexed using the polymerase chain reaction (PCR) and sex-specific primers. One sex marker was run that is positive for female plants and another marker was run that is positive for male plants, ensuring proper sex identification. Females from both types of populations are being examined for genetic variation using seven microsatellite loci.

While all the data has yet to be collected, initial results reveal a few interesting findings. The bisexual populations are becoming more female biased, indicating that females are able to out compete the males on some levels. Also, from the raw data, it seems the all female populations have small amounts of genetic diversity, indicating they arise mainly from asexual reproduction. Consequences of the work include quantifying the amount of genetic variation within species due to sexual reproduction. Also, the significance of this study is that it tests basic predictions of the difference between sexual and asexual populations that have not yet been addressed in a plant system with unisexual populations.